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Filed : June 24, 2003

REMARKS

Claims 1, 3-11, 13-19, and 21 are pending in this application. Claims 1, 5-7, 9, and 19 have been amended. New Claim 21 has been added. Support for the amendments and new claim is found in the specification and claims as filed.

Claim Rejections - 35 U.S.C. § 102(b)

Claims 1, 3, 4, and 13-19 have been rejected under 35 U.S.C. §103(a) as obvious over U.S. Patent No. 4,873,037 (hereinafter "Chau *et al.*") in view of U.S. Patent No. 4,906,371 (hereinafter "Miller"). To establish a *prima facie* case of obviousness under 35 U.S.C. §103(a), the PTO must, *inter alia*, cite prior art that teaches or suggests all the claimed limitations. *In re Royka*, 490 F.2d 981 (C.C.P.A. 1974). Alternatively, to establish a *prima facie* case of obviousness, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. *See, e.g.*, M.P.E.P. § 2142. As discussed below, the cited references do not disclose all of the recited limitations of the pending claims as amended, and furthermore there is no suggestion in either of the cited references to combine or modify the references so as to produce the claimed invention.

Pending independent Claim 1 as amended recites a filter laminate comprising, *inter alia*, "a first membrane layer comprising a first membrane, wherein said first membrane is a microporous or ultraporous asymmetric membrane, said first membrane having a first surface and a second surface, each of said surfaces comprising pores, and a support region between said first surface and said second surface, said first membrane comprising an asymmetric region comprising flow channels that gradually increase or decrease in diameter from a point in said support region to said second surface; at least a second membrane layer comprising a second porous membrane; and a porous bonding layer, wherein said bonding layer is a hot melt adhesive heat-bonded to said first membrane layer and to said second membrane layer." Pending independent Claim 19 as amended recites a filter laminate comprising, *inter alia*, "a first distinct preformed layer of material, said first distinct preformed layer comprising a first membrane layer, said first membrane layer comprising a microporous or ultraporous asymmetric membrane, said microporous or ultraporous asymmetric membrane having a first surface and a second surface,

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each of said surfaces comprising pores, and a support region between said first surface and said second surface, said first membrane comprising an asymmetric region comprising flow channels that gradually increase or decrease in diameter from a point in said support region to said second surface; a second distinct preformed layer of material, said second distinct preformed layer comprising a second porous membrane layer; and a third distinct preformed layer of material, said third distinct preformed layer comprising a third membrane layer; wherein each layer is adjacent to at least one other layer, wherein adjacent layers are secured by a porous bond, and wherein the bond is formed by a hot melt adhesive heat-bonded to said adjacent layers.”

As discussed in Applicants’ response to the previous Office Action, Chau *et al.* discloses a microporous membrane with a separation layer formed thereon. This filter includes a support characterized by a narrow pore size distribution (col. 9, lines 44-48). A separation layer is then applied to the support. The separation layer is in the form of a “dense continuous layer having a minimum of flaws” (col. 11, lines 16-17). In order to separate dense gases and dense liquids, the separation layer must be nonporous but selectively permeable to the gas(es) and/or liquid(s) of interest. The separation layer is applied to the supporting layer to yield what Chau *et al.* refer to as an “asymmetric membrane,” which is actually a composite of two different membrane layers, one an isotropic microporous support layer, and the other a nonporous separation layer. Chau *et al.* does not disclose a filter laminate including an asymmetric membrane having “an asymmetric region comprising flow channels that gradually increase or decrease in diameter,” as recited in independent Claims 1 and 19. Miller discloses asymmetric membranes, but merely states that they are “membranes having one side formed with a very tight thin layer which is supported by a more porous open structure,” but does not disclose any particular flow channel morphology. As is recognized by those skilled in the art, asymmetric membranes can have different supporting structures (see, e.g., U.S. Patent No. 6,994,811, describing asymmetric membranes having “monotonic,” “hourglass,” and “funnel” supporting structures). The morphology of the flow channels is not specified in Miller. Accordingly, asymmetric membranes of the type recited in Claims 1 and 19 having “an asymmetric region comprising flow channels that gradually increase or decrease in diameter” are not disclosed. Because neither Chau *et al.* nor Miller discloses a filter laminate including an asymmetric membrane having an asymmetric region comprising flow

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channels that gradually increase or decrease in diameter, a *prima facie* case of obviousness cannot be established.

As acknowledged in the Office Action, Chau *et al.* does not disclose laminates comprising hot melt adhesives. The Office Action proposes to combine the teachings of Miller with those of Chau *et al.* However, this cannot yield the invention as presently claimed in Claims 1 and 19, which includes porous bonding layer (Claim 1) or porous bond including a hot melt adhesive. Miller discloses a filter element incorporating a microporous membrane having an elongated porous filtration area bordered by substantially non-porous sealing areas of non-porous tape heat sealed to the membrane (see col. 12, ll. 3-6). The tape is a polymeric tape which is non-porous (emphasis added, see col. 12, ll. 55-59). Accordingly, in Miller, the membrane has two distinct types of regions: 1) porous filtration areas comprising layers that are adjacent to each other but not bonded to each other (non-laminated areas), through which filtration takes place; and 2) non-porous regions where layers are bonded to each other by a non-porous heat sealable tape (laminated areas), which results in a non-porous bond through which no filtration takes place. The use of a non-porous sealing (bonding) layer is critical in the filters of Miller, and Miller distinguishes his sealing methods from those of the prior art based on this non-porous sealing layer: "in most of the prior art uncovered by applicant relating to sealing filters, the filter media sealing area is porous, so that when a thermoplastic or sealing surface is applied thereto it flows through the porous media to effect the seal." See col. 7, ll. 24-28.

Using the non-porous sealing tape of Miller to bond together two membrane layers across their entire surface area would yield a laminate unsuitable for use as a filtration media because the laminate would be non-porous – no liquid could pass through it. Likewise, if only an outer sealing portion of two membrane layers were laminated, and not the remaining portion used for filtration, the filtration portions would not be laminated and the full benefits of lamination as described in Applicants' specification as filed would not be achieved (see page 11, ll. 17-19 "If the membranes are not laminated together, there is a chance that they can separate during packaging into cartridges, during filtration, and/or during integrity testing."). To establish a *prima facie* case of obviousness, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. However, if the proposed

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modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984). The proposed modification of Chau *et al.* by Miller would result in a laminate unsuitable for use as a filter because it is non-porous, or a filter where the portions through which liquid is filtered are not laminated – either way, the combination does not yield a filter laminate as presently claimed in independent Claims 1 and 19.

Accordingly, Applicants respectfully request that the anticipation rejection be withdrawn.

Claim Rejection - 35 U.S.C. §103(a)

Claims 5-11 have been rejected under 35 U.S.C. §103(a) as obvious over Chau *et al.* in view of Miller and further in view of US 5,006,247 (“Dennison *et al.*”). As discussed above in regard to the section 103(a) rejection, Chau *et al.* and Miller *et al.* do not disclose a filter laminate comprising a microporous or ultraporous asymmetric membrane having “an asymmetric region comprising flow channels that gradually increase or decrease in diameter,” or a filter laminate wherein layers of the laminate are heat-bonded to each other by a hot melt adhesive via a porous bonding layer or a porous bond. Dennison *et al.* is cited as disclosing microporous or ultraporous asymmetric membranes, and it is asserted that it would have been obvious to substitute the Dennison *et al.* asymmetric porous membrane as the porous membrane in Chau *et al.* in order to make the filter useful in microfiltration or ultrafiltration.

Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). As discussed below, there is no teaching, suggestion, or motivation to combine Dennison *et al.* or Miller with Chau *et al.* to yield the invention as claimed in independent Claim 1, from which pending Claims 5-11 depend.

As is recognized by one of skill in the art, membranes are not randomly interchangeable – their compositions, morphologies, and flow characteristics must all be carefully considered in view of the use to which they will be put. The Chau *et al.* laminates are used for gas and liquid separations, and not for microfiltration or ultrafiltration (i.e., filtration of solid particles from a

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liquid). If the asymmetric layer of Dennison *et al.* (or the asymmetric membrane of Miller) were substituted for the separation layer of Chau *et al.*, then the Chau *et al.* membrane system would no longer be capable of use in gas and liquid separations. Likewise, substituting the Chau *et al.* membrane for a microfiltration or ultrafiltration membrane would yield a membrane unsuitable for use in filtering solid particles from a liquid. If proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984).

Moreover, if the asymmetric layer of Dennison *et al.* were substituted for the support layer of Chau *et al.*, then the benefits of the Chau *et al.* support would be lost, *i.e.*, a narrow pore size distribution coupled with a small pore size. The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990).

To articulate a *prima facie* case of obviousness under 35 U.S.C. §103(a), the PTO must, *inter alia*, cite prior art that teaches or suggests all the claimed limitations. *In re Royka*, 490 F.2d 981 (C.C.P.A. 1974). It is noted that Dennison *et al.* discloses asymmetric membranes which can be cast onto a porous support. Methods of preparing composite membranes by casting or forming one membrane layer *in situ* directly on top of another membrane layer are discussed in the present application on page 2 at lines 9-23. As discussed in the present application, one of the disadvantages of such processes is that the fibers of the support layer can penetrate into the adjacent membrane zone. Such penetration by the support layer can adversely affect the separations properties of the adjacent membrane. Applicants avoid this potential problem by using a bond or bonding layer comprising a hot melt adhesive between the membrane layers, which is not disclosed in Dennison *et al.* It is also noted that the membranes of Dennison *et al.* do not possess "an asymmetric region comprising flow channels that gradually increase or decrease in diameter" as recited in Claim 1. The cross sectional figures of Dennison *et al.* show hollow tube-like structures of relatively constant diameter, with abrupt transitions to hollow tube-like structures with larger or smaller diameters, not a gradual increase or decrease in diameter.

Accordingly, Applicants respectfully request that the rejection be withdrawn.

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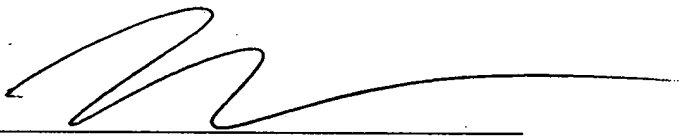
Conclusion

In view of the foregoing amendments and remarks, it is respectfully submitted that the present application is in condition for allowance. Should the Examiner have any remaining concerns that might prevent the prompt allowance of the application, the Examiner is respectfully invited to contact the undersigned at the telephone number below.

Respectfully submitted,

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Dated: 3/10/06

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AMEND

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